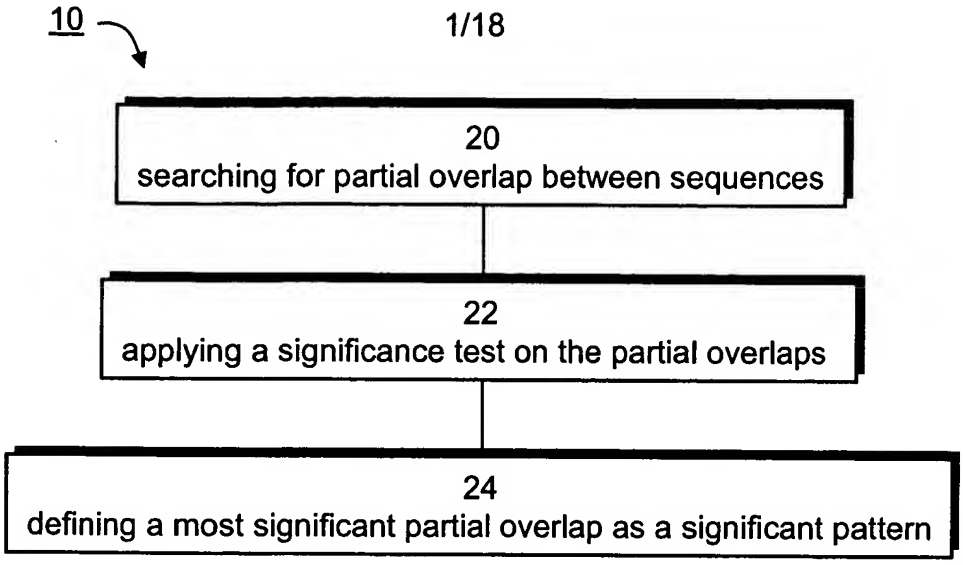

10
20
searching for partial overlap between sequences
22
applying a significance test on the partial overlaps
24
defining a most significant partial overlap as a significant pattern

Fig. 1

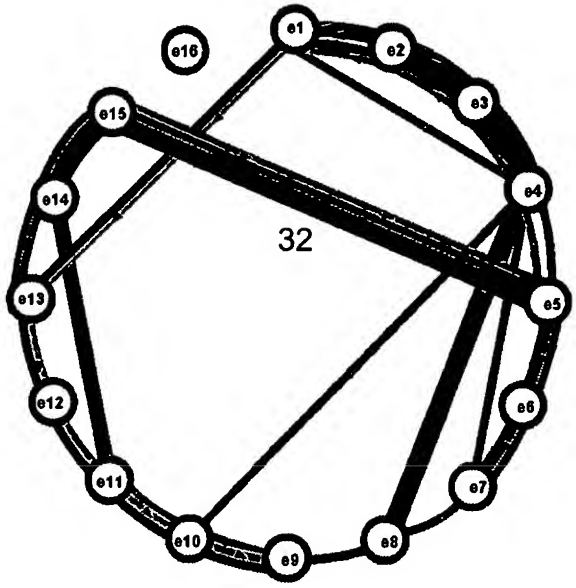

e1
e2
e3
e4
e5
e6
e7
e8
e9
e10
e11
e12
e13
e14
e15
e16
32

Fig. 2a

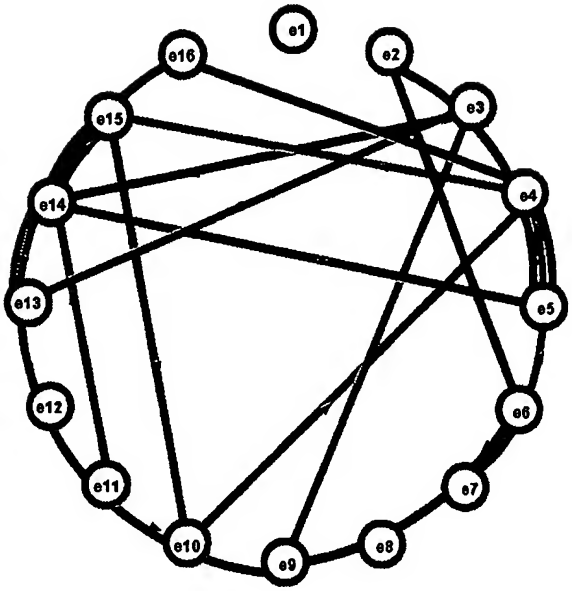

e1
e2
e3
e4
e5
e6
e7
e8
e9
e10
e11
e12
e13
e14
e15
e16

Fig. 2b

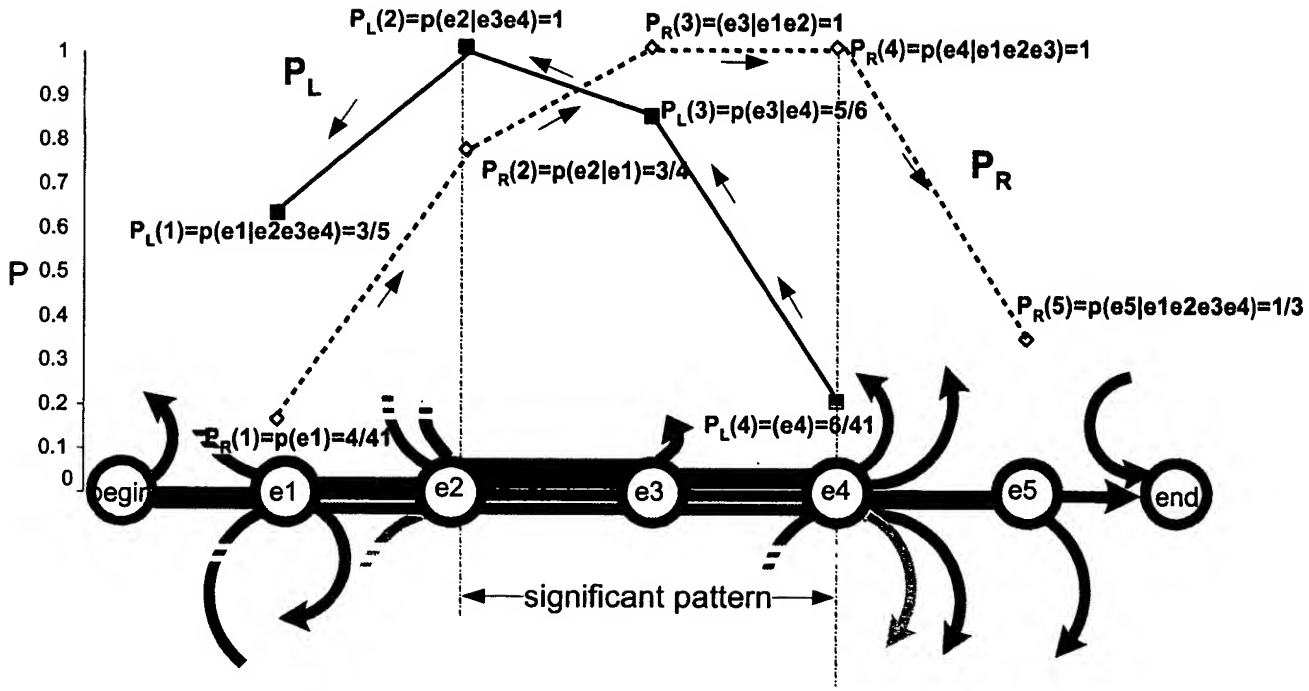

P
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
P_L
P_R
P_L(1)=p(e1|e2e3e4)=3/5
P_L(2)=p(e2|e3e4)=1
P_L(3)=p(e3|e4)=5/6
P_L(4)=(e4)=6/41
P_R(1)=p(e1)=4/41
P_R(2)=p(e2|e1)=3/4
P_R(3)=(e3|e1e2)=1
P_R(4)=p(e4|e1e2e3)=1
P_R(5)=p(e5|e1e2e3e4)=1/3
begin
e1
e2
e3
e4
e5
end
significant pattern

Fig. 3

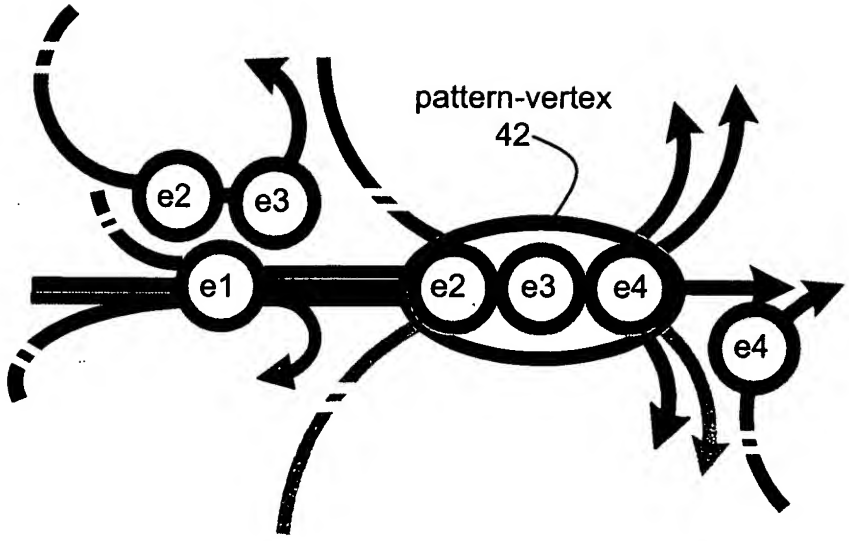

pattern-vertex
42
e2
e3
e1
e2
e3
e4
e4

Fig. 4

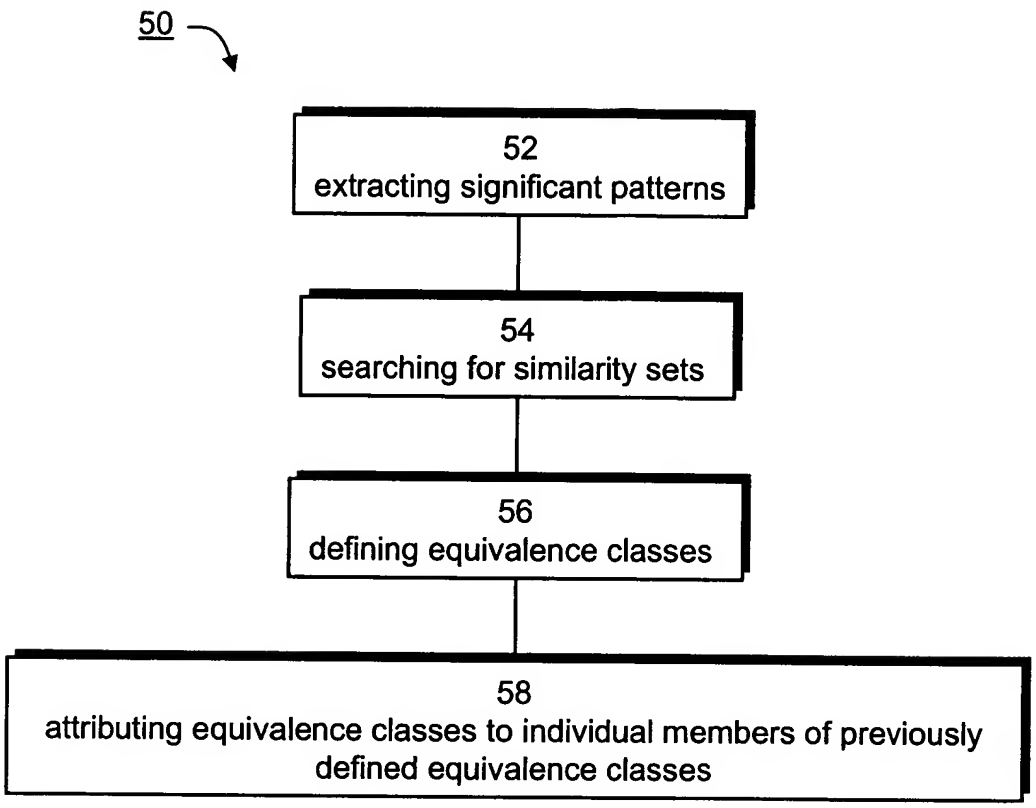

50
52
extracting significant patterns
54
searching for similarity sets
56
defining equivalence classes
58
attributing equivalence classes to individual members of previously defined equivalence classes

Fig. 5

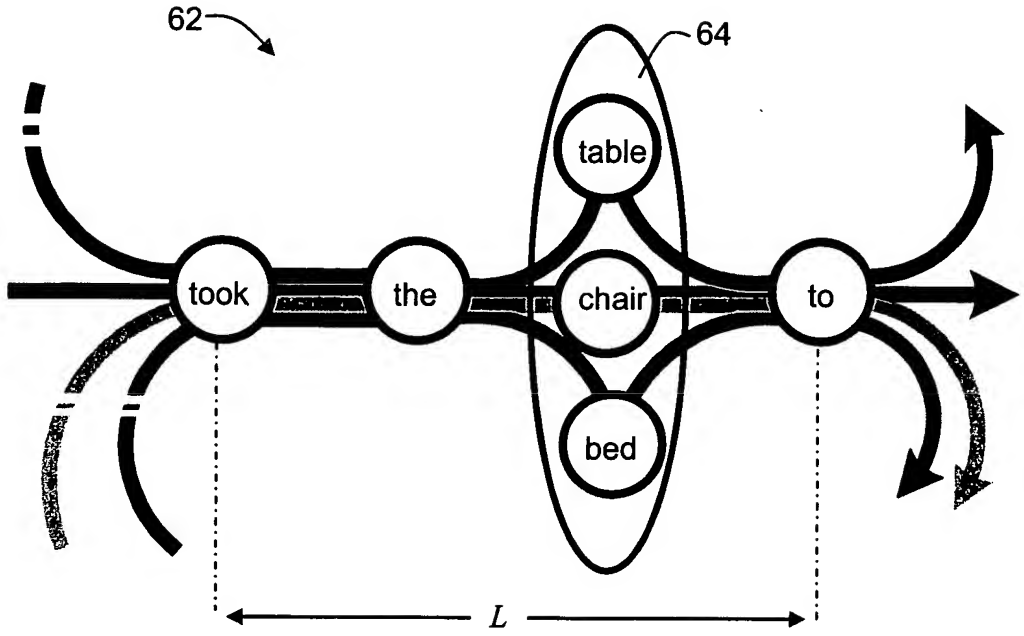

62
64
table
took
the
chair
to
bed
L

Fig. 6a

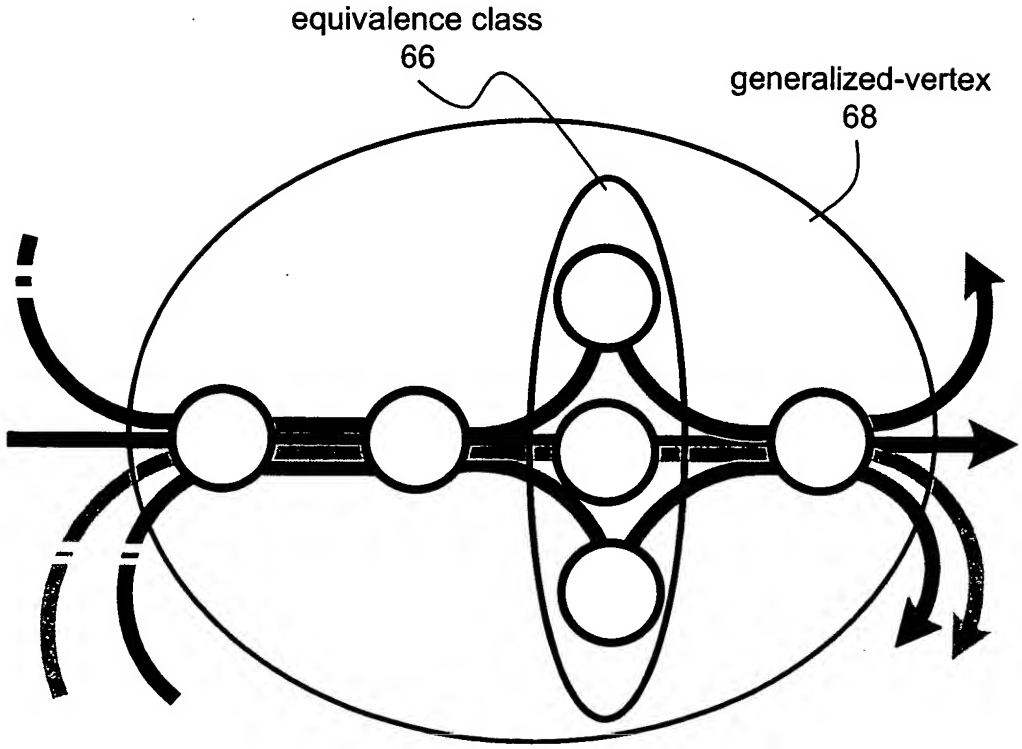

equivalence class
66
generalized-vertex
68

Fig. 6b

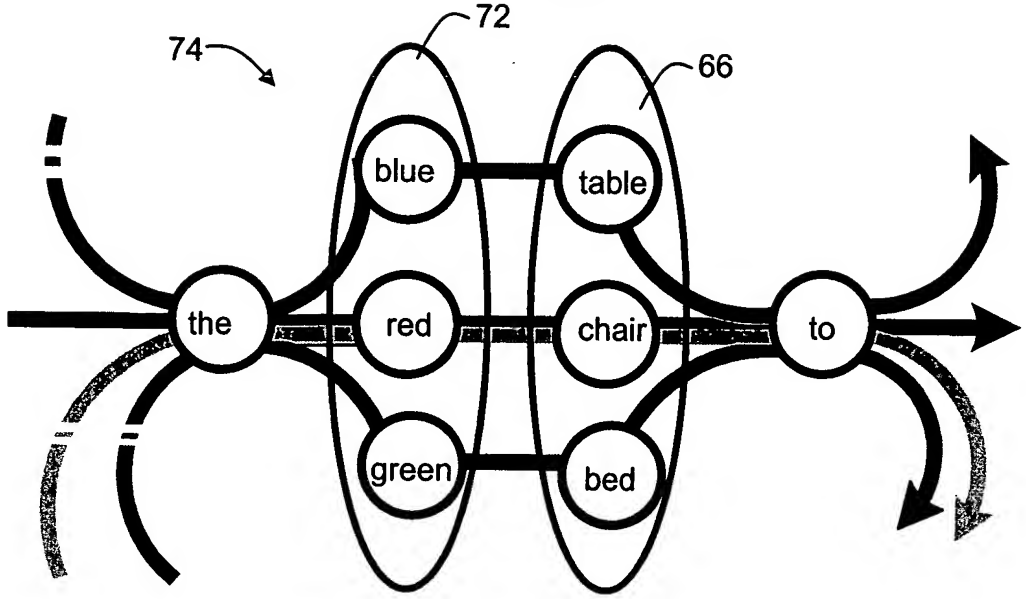

72
74
66
blue
table
the
red
chair
to
green
bed

Fig. 7a

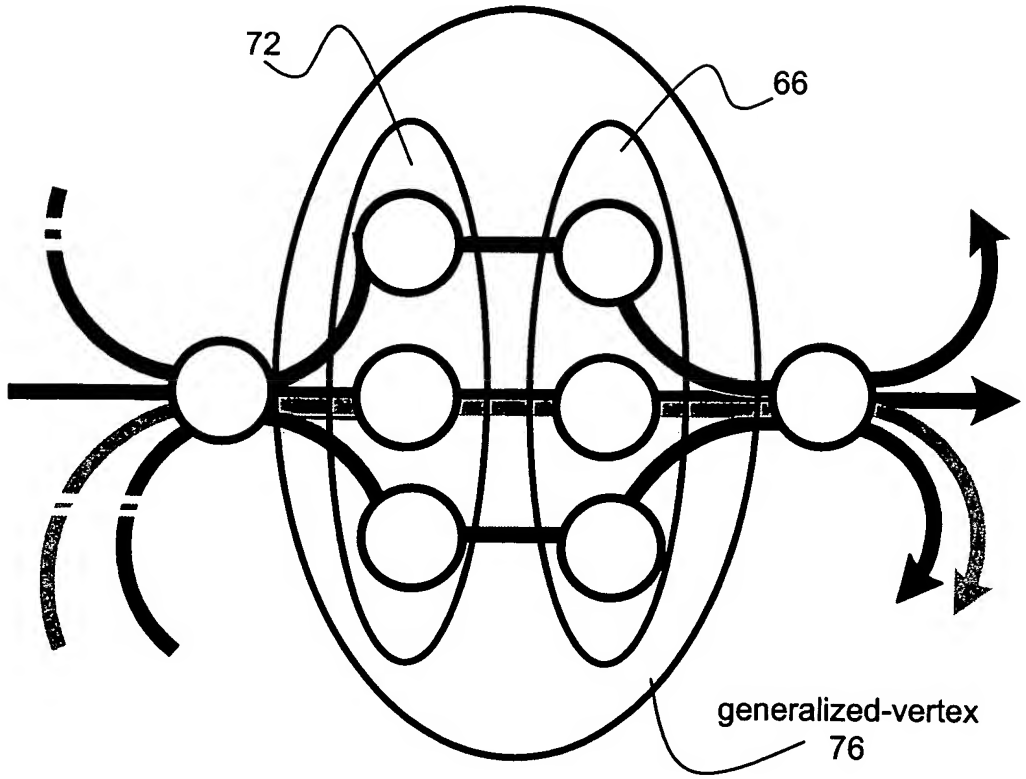

72
66
generalized-vertex
76

Fig. 7b

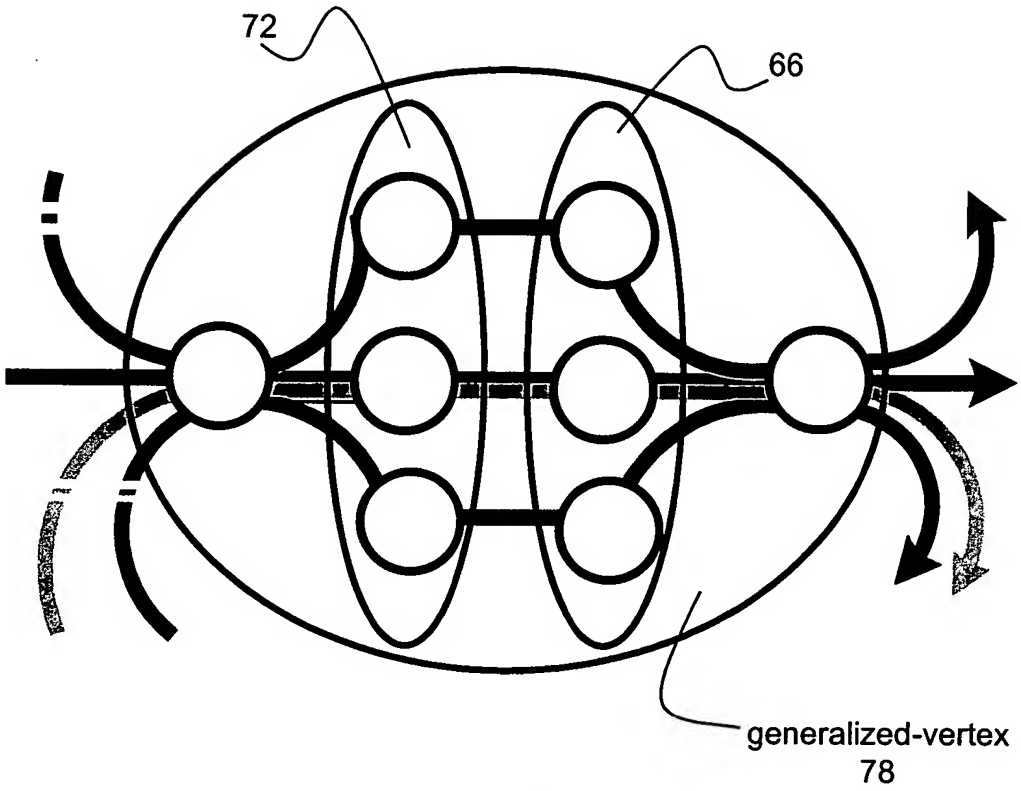


Fig. 7c

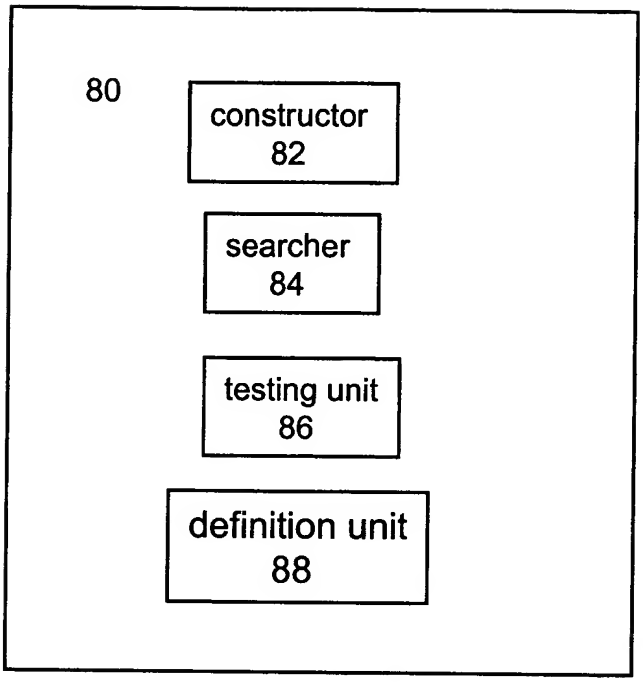

80
constructor
82
searcher
84
testing unit
86
definition unit
88

Fig. 8

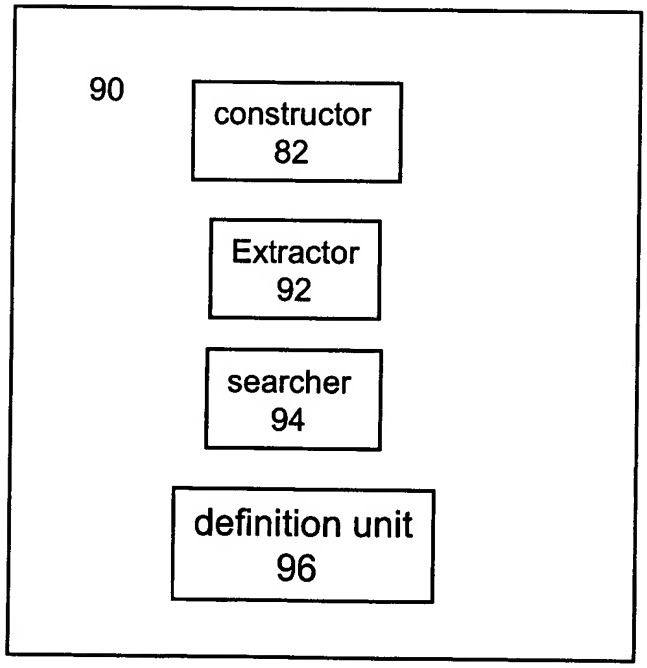

90
constructor
82
Extractor
92
searcher
94
definition unit
96

Fig. 9

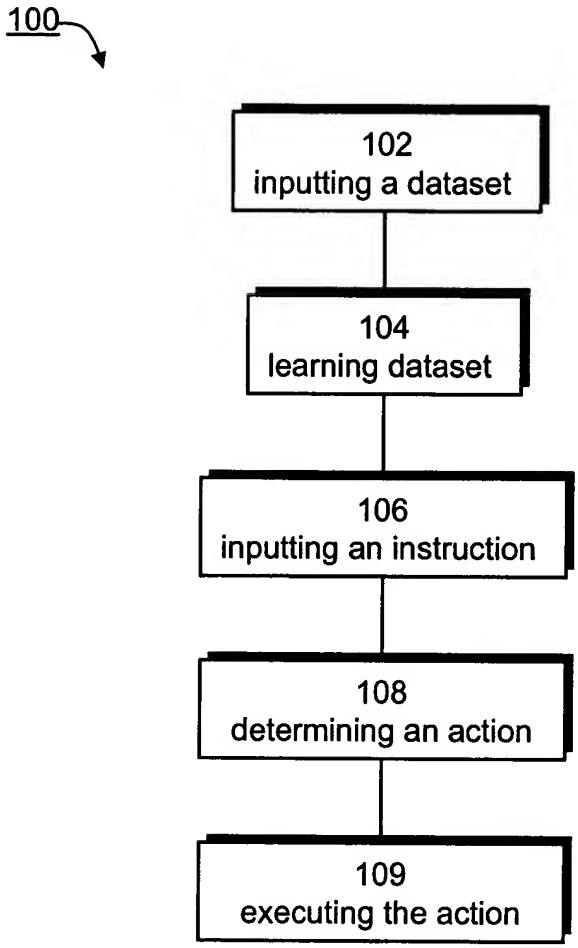

100
102
inputting a dataset
104
learning dataset
106
inputting an instruction
108
determining an action
109
executing the action

Fig. 10

Fig. 11a

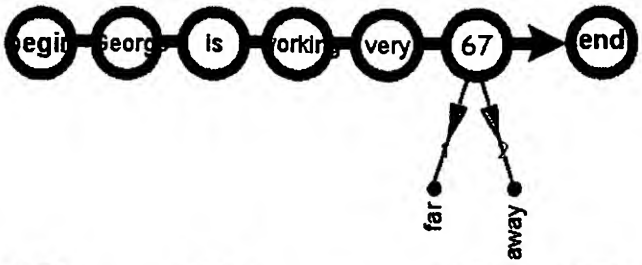


Fig. 11b

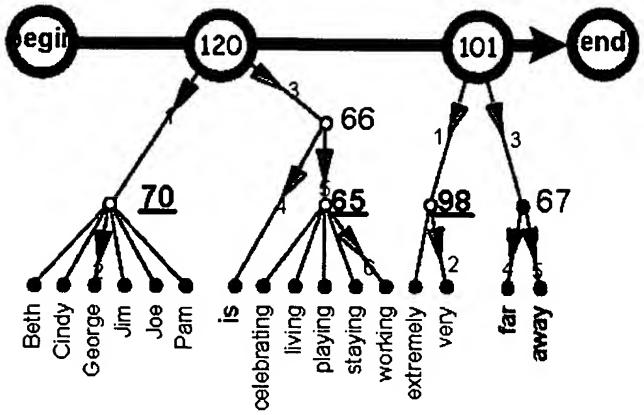


Fig. 11c

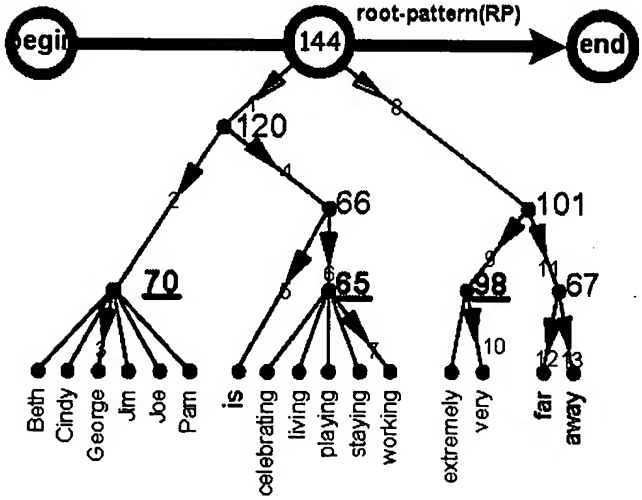


Fig. 11d

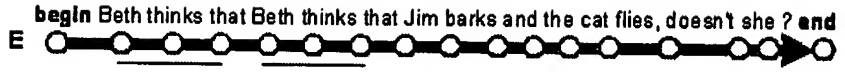
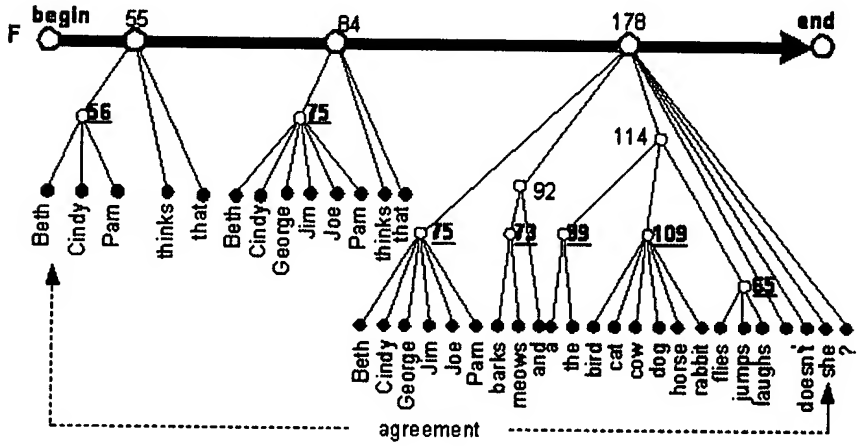


Fig. 11e



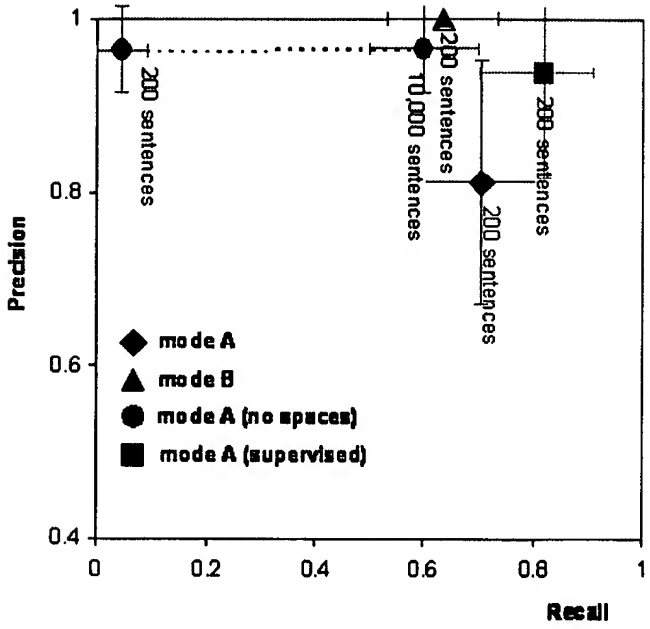

1
0.8
0.6
0.4
0
0.2
0.4
0.6
0.8
1
Precision
Recall
200 sentences
10,000 sentences
200 sentences
200 sentences
200 sentences
mode A
mode B
mode A (no spaces)
mode A (supervised)

Fig. 12

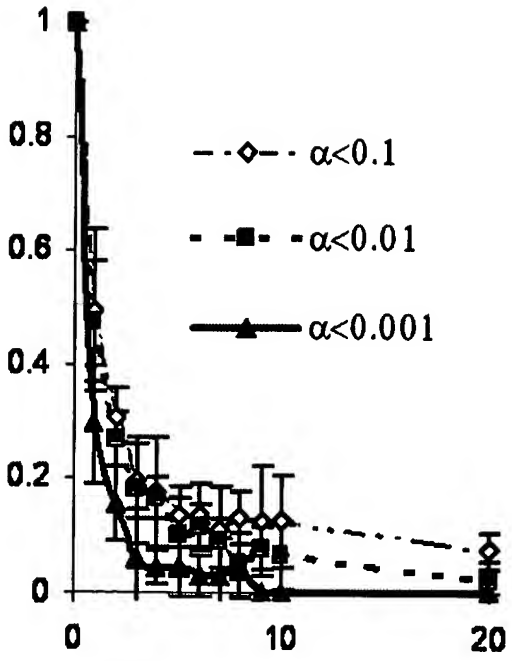


Fig. 13

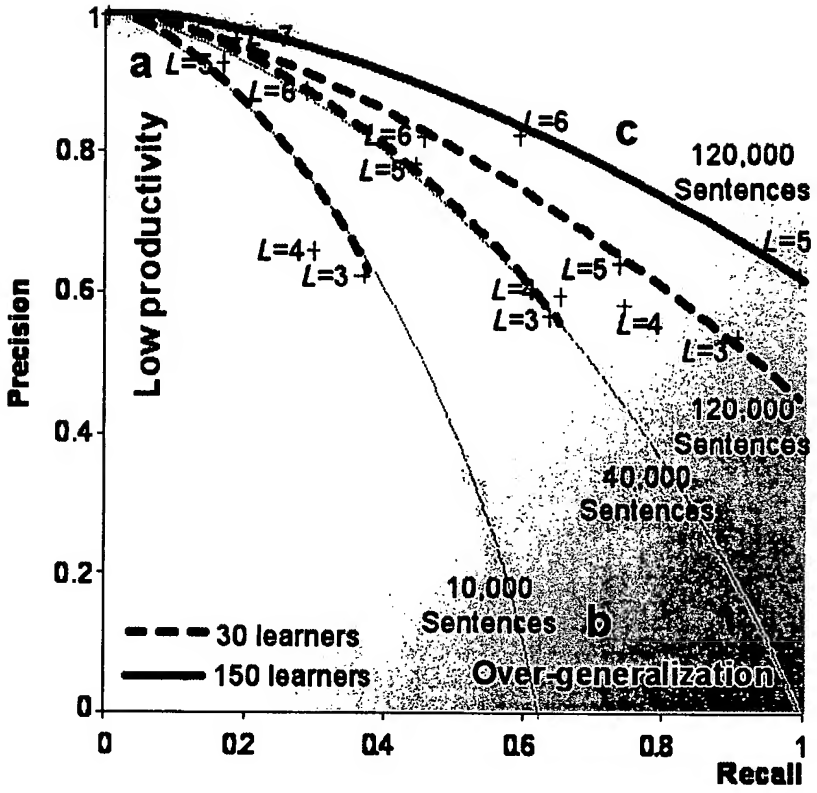


Fig. 14a

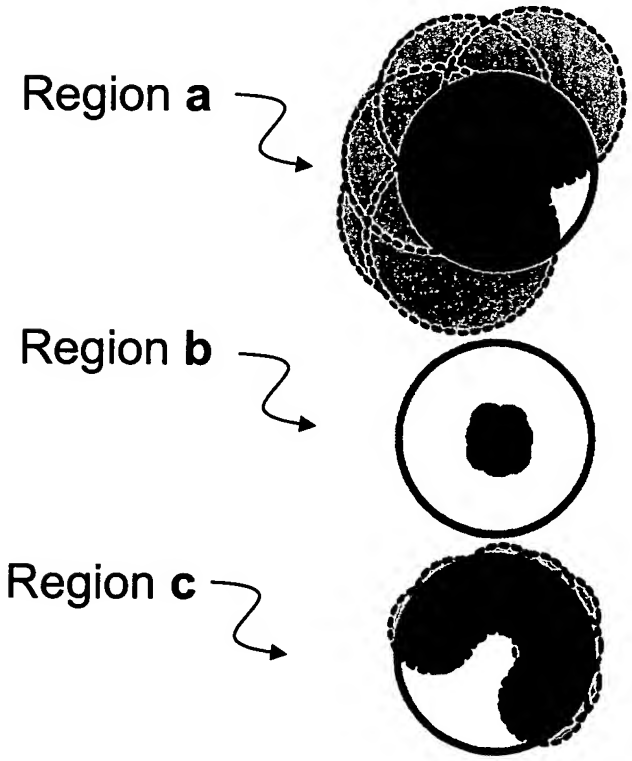
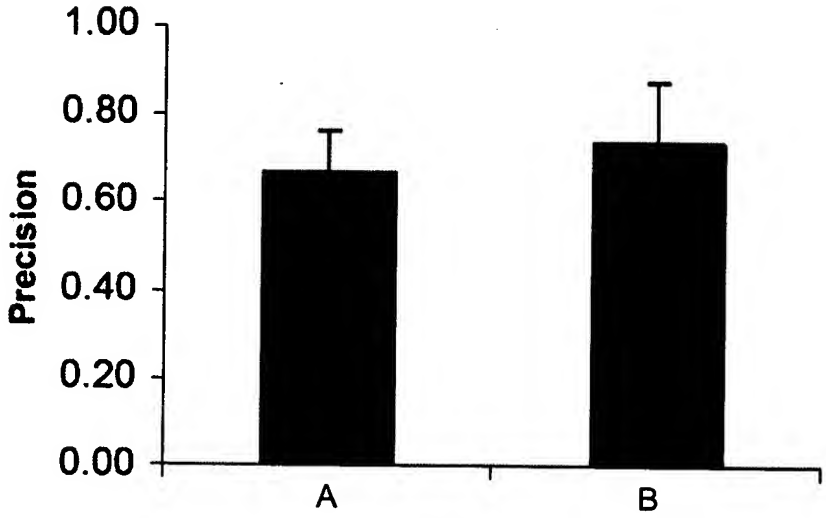


Fig. 14b

Fig. 15a



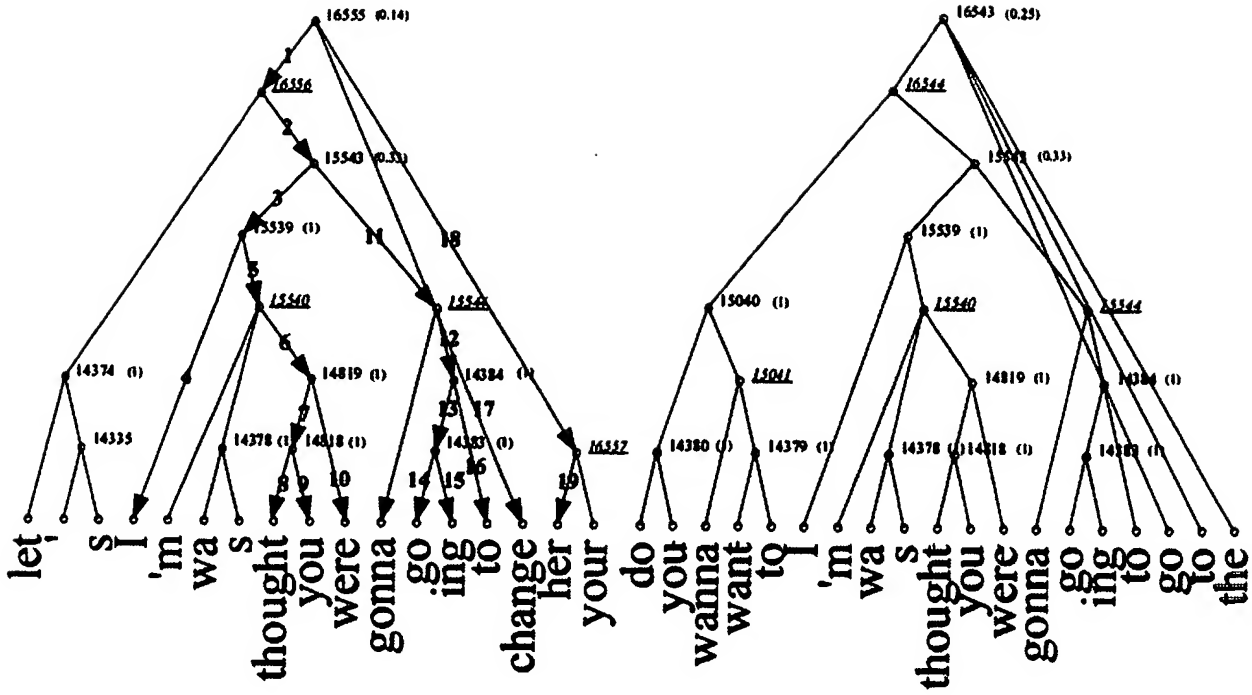


Fig. 15b

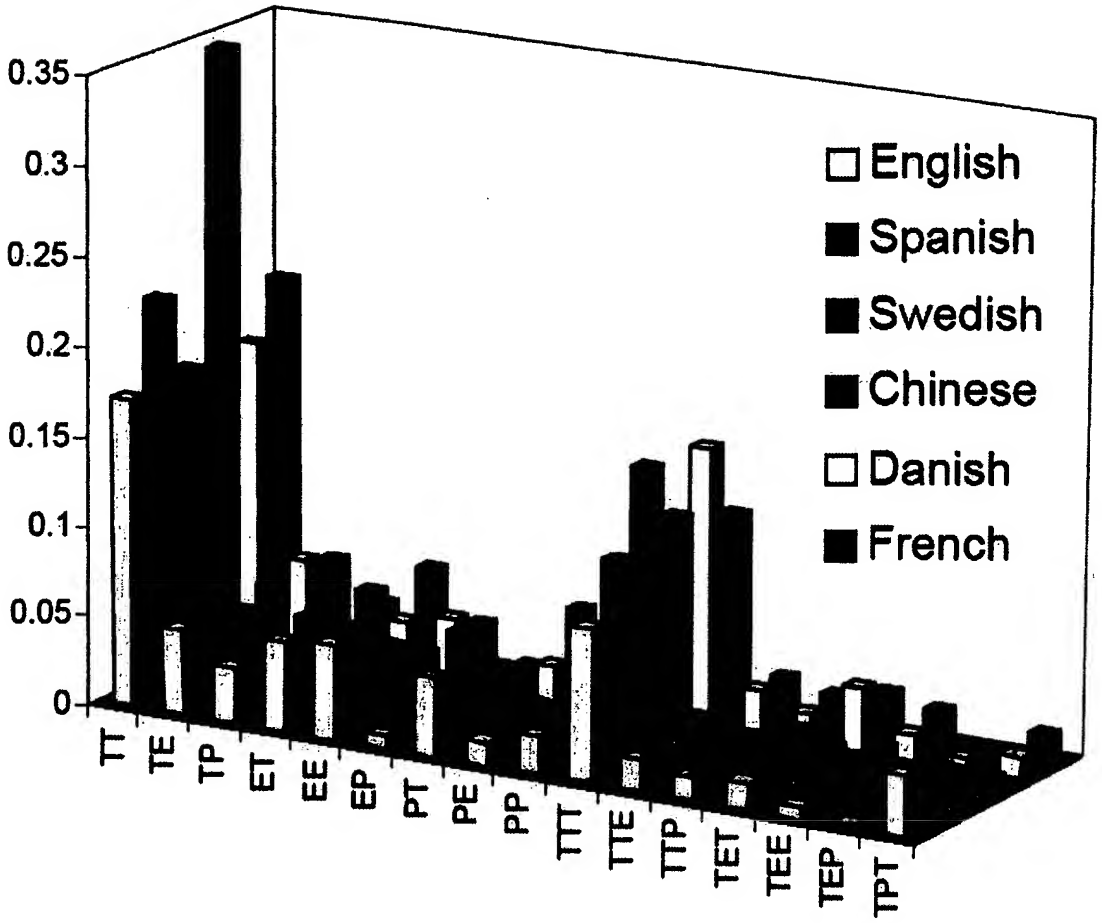
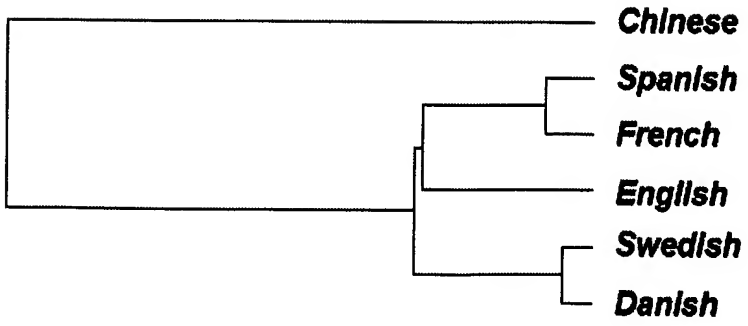


Fig. 16a

Fig. 16b



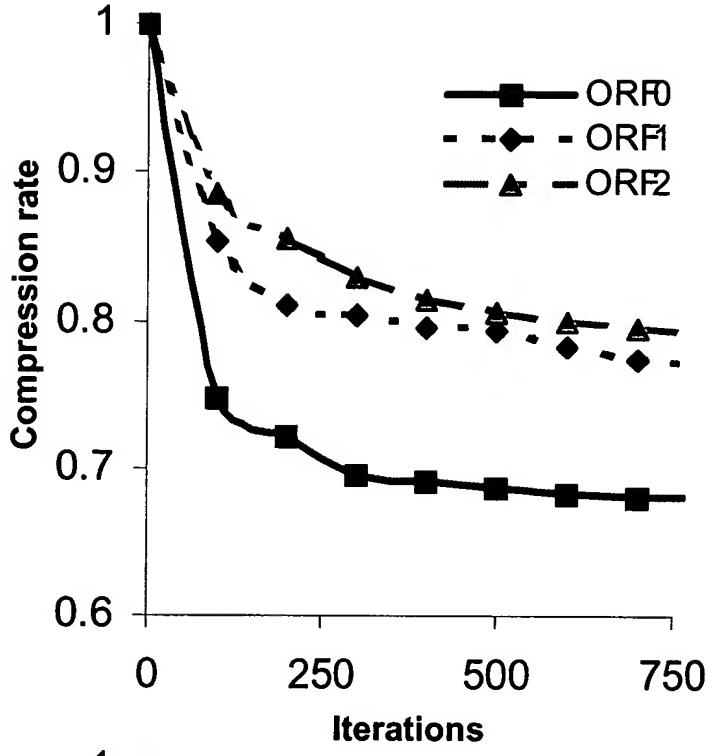


Fig. 17a

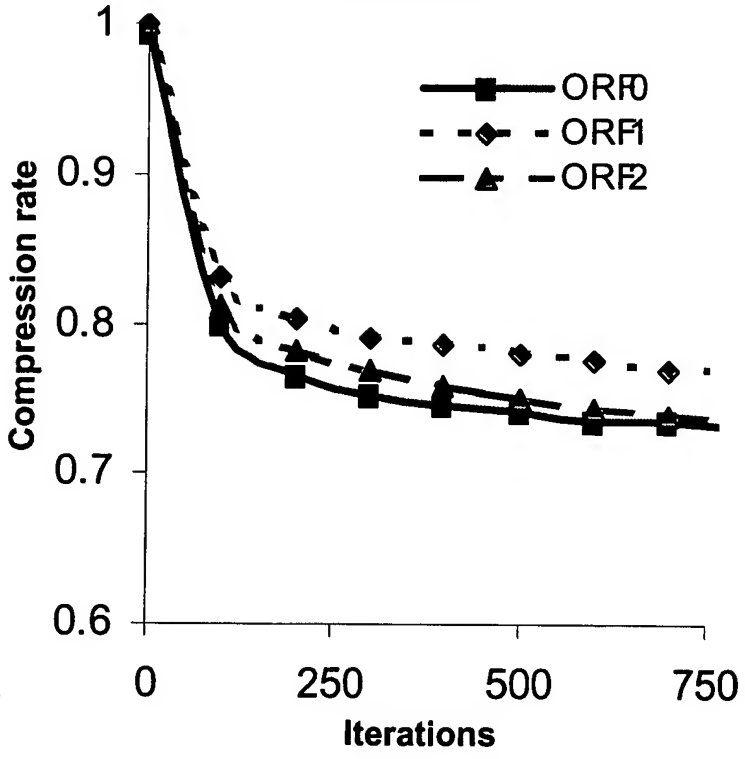


Fig. 17b

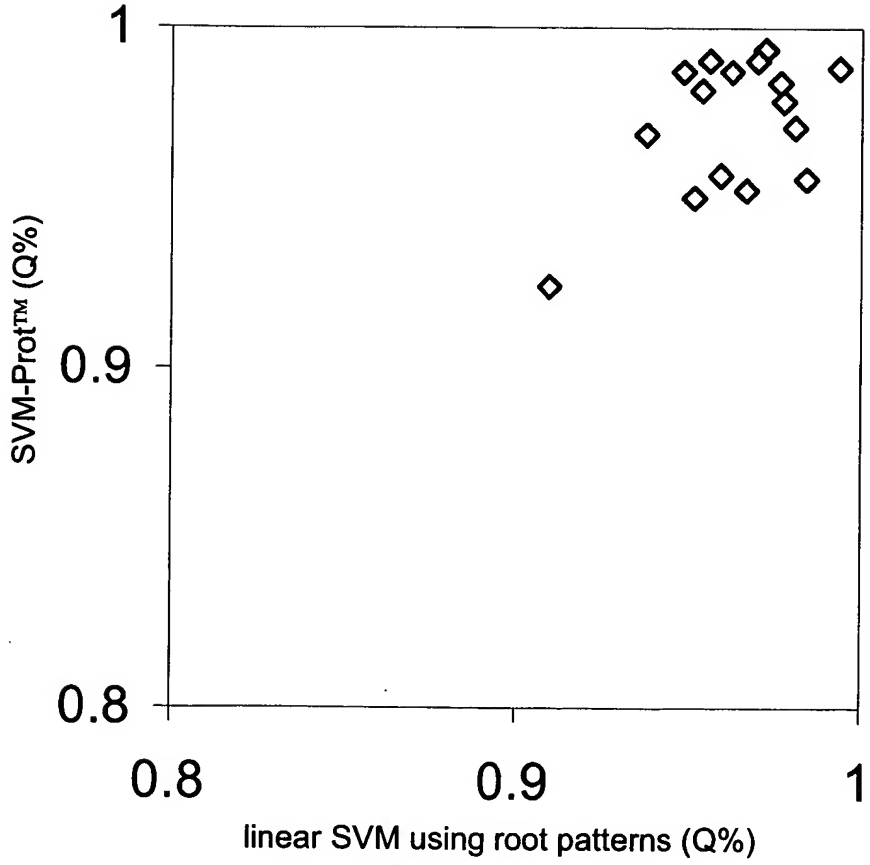


Fig. 18